The Commission (*Fourth Notice* at para. 39) asks if the six classes of assets used by Christensen are the most appropriate.[43] The Commission appears to be concerned that, although depreciation rates are prescribed for over 30 capital accounts, Christensen aggregates the assets into six categories. In GTE's view: first, the six asset categories used by Christensen are sufficient to construct an economically meaningful capital input measure. Second, even the BEA uses broad categories of assets. Third, it would be impossible to gather the data required to construct a capital input measure based on more than thirty accounts, and in any event it would be contrary to the Commission's goal of simplification.

D.   **The perpetual inventory method is a reasonable method to estimate capital stock just as the use of capital stock is a reasonable representation of capital services. (Issues 1d and 1e)**

The perpetual inventory method[44] used by Christensen is the generally accepted method for performing productivity studies. Further, it is consistent with the approach used by the BLS in its TFP studies. The only alternative that would produce more accurate results requires the collection of data by vintage on all LEC plant and equipment for each

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[43]   The asset classes used by Christensen are buildings, general support equipment, central office equipment (including operator systems), transmission equipment, information origination/termination equipment, and cable and wire.

[44]   The quantity of capital is based on the cost of plant and equipment added in previous years and adjusted for changes in the prices paid over time, and declines in efficiency as a result of aging.

year included in a study. This is not only a prohibitively laborious task, but contrary to the Commission's desire to simplify the Christensen methodology.

The use of capital stock to represent the quantity of capital input is also consistent with BLS practices and with standard productivity research practices. Capital consumption is not a valid substitute for capital stock. Capital consumption implies that an asset loses capital efficiency over time. Using capital consumption to measure capital services incorrectly implies that an asset has not provided service over time -- which is not the case with telephone plant and equipment.

E. Christensen's method of converting capital stock into capital cost is based on economic theory. (Issue 1f)

As the Commission notes (*Fourth Notice* at para. 48), "the value of capital services is assumed to be the rental value in a competitive market of the capital stock providing these services." The Commission then questions Christensen's "implicit rental price,"[45] which is the hypothetical price of renting telephone plant and equipment in a competitive market. Capital stock must be turned into capital cost using a rental price equation. Christensen's implicit rental price, which bases capital cost on taxes, economic depreciation, capital gains, and the cost of capital, is soundly based on economic theory and is consistent with the rental price equation used by BLS.[46] Christensen's implicit

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[45]   Capital stock is multiplied by the implicit rental price to determine the value of capital services.

[46]   *See* USTA's Comments in the instant proceeding, Attachment A.

rental price formula does introduce significant volatility in capital prices. This volatility has little impact on TFP, but has a significant impact on input prices. Therefore, it is particularly important that any PCI estimate which is based on LEC input prices should be optimally forecast using the method proposed by GTE.

F. Labor should not be further decomposed, and the GDPPI remains a valid approximation of a material price index. (Issues 1g and 1h)

Christensen used management and non-management hours in the development of the LEC TFP. The Commission now asks (*Fourth Notice* at para. 52) whether or not labor categories should be further subdivided based on education or vocational experience. First, if the Commission is really attempting to simplify the TFP methodology, then further disaggregation is not the solution. Second, even the management and non-management hours used by Christensen are not publicly available.[47] If the Commission wants publicly available data, then total employees, as reported on the ARMIS 4302 Report, is the only data available to be used in a TFP study.

Third, as noted above, categories of inputs can be aggregated up to the point where input price growth begins to deviate substantially. That is, as long as the relative prices of two inputs, or a group of inputs, do not change -- as would be the case if their

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[47]   Although non-management hours are reported, not all management hours are reported and, therefore, any numerical value assigned to management hours must be based on an estimate of the average hours worked by management employees.

growth rates were roughly the same -- the inputs can be combined and no further

disaggregation will improve accuracy. Further, such disaggregation would require

burdensome data-gathering and time-consuming computation. In the case of labor,

wages within a corporation tend to move together. So do wages within an industry.

Benchmarking the wages of jobs relative to other firms in the industry is a common

practice of large corporations. This, among other things, reinforces the tendency for

wages to grow at the same rate. This common growth means that the relative prices

between the jobs stay fairly constant, thus allowing the aggregation of labor into a small

number of categories

Christensen used the GDPPI as a proxy for a material index because it is

virtually impossible to calculate one. Material purchases made by LECs would have to

be categorized and indexes of the prices paid developed. The data involved makes it

prohibitive to develop a material index, and certainly would complicate the calculation of

TFP -- not simplify it. GDPPI is an acceptable proxy.

G.   TFP should be based on TOTAL company productivity. (Issue 1j)

GTE does not support the calculation of a separate interstate TFP because it is

not economically meaningful. A properly constructed productivity offset: (i) reflects the

entire range of diverse factors that cause changes in the unit cost of production for the

LECs; and (ii) should measure changes in the overall efficiency of production. Partial

measures of productivity are inconsistent with the economics of price caps because

they are confined to particular inputs or outputs.

Further, unless the technology of the industry is separable between inter- and intrastate production, there is no economically meaningful method of separating production. The appropriate PCI will contain the effects of all inputs and outputs used by the firm. It will not be distorted by artificial jurisdictional separations that have no basis in production and have no significance in market terms. Separability requires that the production of the separable activities be most efficiently done independently. If there are common facilities or shared resources, the activities are not separable. Since all services eventually use a loop, switch, processor or port, interstate and intrastate telecommunications services are not separable and cannot be treated separately.

The difference in demand between intra- and interstate services is not an issue with TFP. There is a direct relationship between output growth, whether it is intra- or interstate, and TFP growth. As discussed by NERA, faster output growth in usage leads to faster replacement of the switches and trunks that produce both intra- and interstate usage services. Therefore, more rapid interstate usage growth leads to more rapid TFP growth, and vice versa for intrastate. TFP growth rates would be the same, independently of which service was growing faster over any historical period.[48] It clearly would be inappropriate to attempt to separate TFP into intra- and interstate.

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[48] *See* USTA's Comments in the instant proceeding, Attachment C.

H. Other firms should not be included in the TFP calculation. (Issue 1m)

GTE does not support the inclusion of firms other than price cap LECs in the calculation of TFP. As a matter of precedent as well as logic, price cap regulation establishes productivity factors based only on those firms being regulated. This conclusion is demonstrated by the following: First, the Commission based the productivity factor in AT&T's price cap formula only on AT&T's expected productivity. Second, although the productivity factor for the cable industry was set at zero, the Commission did not consider the inclusion of other industry segments in establishing this factor. Third, the Rail Cost Adjustment Factor ("RCAF") used by the ICC reflects only railroad productivity.[49]

Even if a precedent had not been established for developing productivity factors based on the industry segment being regulated, it would be improper to include other than price cap LECs in a measurement of TFP for the LEC price cap formula. Inclusion of other industry segments could distort the estimate of actual achieved productivity growth of price cap LECs.

For example, LECs operating under rate of return regulation do not have the same incentive to achieve productivity gains as price cap LECs. Therefore, inclusion of

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[49] "[T]he RCAF calculation was modified so that changes in railroad costs would reflect changes in railroad productivity as well as changes in input prices." *(footnote omitted)* Interstate Commerce Commission Reports, *Ex Parte* No. 290 (Sub-No. 7), Productivity Adjustment-Implementation, decided October 26, 1993, at 1072.

rate of return LECs could have the effect of lowering the productivity factor because

their growth in productivity year-to-year would be lower than that of the price cap LECs.

Although this would definitely benefit the price cap LECs, GTE does not support this

action. Even if the Commission wanted to include firms other than price cap LECs, the

reality of the situation is that it would be impossible to obtain the data required to

produce a TFP study for multiple industry segments without imposing burdensome

reporting regulations on these other industry segments. As the Commission strives to

eliminate unnecessary and burdensome regulation,[50] the imposition of reporting

requirements necessary to develop a TFP study would be a major step backward.

Given that the price cap methodology attempts to mimic competition among LECs,

the TFP should be developed using only the price cap LECs' inputs and outputs. To

introduce other industry segments into the study would distort the accuracy of the price

cap in replicating the discipline of the market that dictates LECs' performance, in the

same way that introducing the orange-producing segment of the fruit industry would

distort the picture of price changes applicable to apple producers.

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[50]   "[W]e propose to eliminate unnecessary regulatory burdens ...." *Streamlining the International Section 214 Authorization Process and Tariff Requirements*, Notice of Proposed Rulemaking, IB Docket No. 95-118 (released July 17, 1995) at para. 2. Also, "existing tariff filing requirements are unnecessary and overly burdensome ...." *Tariff Filing Requirements for Nondominant Common Carriers*, Memorandum Opinion and Order, CC Docket No. 93-36, 8 FCC Rcd 6752 (1993).

I.   **Universal Service and other subsidy programs do not require an adjustment to the TFP calculation. (Issue 1I)**

TFP captures all outputs including the increased usage resulting from Universal Service and other subsidy programs. Further, calculation of a total company productivity factor, which is the only correct way to calculate TFP, encompasses subsidy programs instituted by the states.

In summary: The simplified TFP method proposed by Christensen in the instant proceeding meets all the criteria established by the Commission as it is: economically meaningful; reasonably simple; and based on accessible and verifiable data. Further, it is correct in its use of total company productivity as opposed to partial measures (*i.e.*, interstate only); and contains only information relative to the industry segment being regulated.

IV.   **GTE WOULD SUPPORT A PCI ADJUSTMENT FACTOR BASED ON A FIVE-YEAR ROLLING AVERAGE, BUT RECOMMENDS IT BE FORMALLY FORECAST. (Issues 3a, 3b, 3c, 3d)**

To emulate the working of a competitive market, the PCI adjustment factor should be a forward looking estimate, based on past history. GTE will propose *infra* an optimal method for arriving at this estimate.

Competitive markets act as though they optimally forecast prices. Specifically, the market uses the available information to predict the likely output and input prices. Since inputs are purchased in competitive markets, all the information on a going forward basis is contained in the prices and past prices. This is because the price

summarizes all the impacts from all the different forces that affect markets. For

example, using data on droughts might explain why the price of wheat behaved as it

did, but it would give no new information about the price of wheat for next period unless

a drought could be predicted in advance. If such a prediction could be done, the

market would use this information. The forecasted drought would immediately enter

into the price in the futures markets and, through arbitrage, have an immediate effect

now -- thus eliminating any further usefulness of knowing there was going to be a

drought. The price series would now incorporate all the information.

Thus, competitive markets behave as though the best predictions are based

solely on current and past prices. Specifically, the market acts as though it forms a

forecast that used all the predictable price variation but discarded the unpredictable, or

totally random variation. This is the essence of the rational expectations hypothesis

that may be found in many textbooks.[51]

GTE suggests that the Commission should estimate the PCI in exactly the same

way. It should form an estimate based solely on current and past values of the PCI.

The price cap model substitutes a PCI -- derived from the difference between the cost-

share-weighted input price change index and a total factor productivity measure -- for

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[51]   *See* for example, A. C. Harvey, *Forecasting, structural time series models and the Kalman filter*, Cambridge University Press: New York, 1989. The theory of rational expectations is widely accepted by economic and business planners throughout much of the modern world. Robert E. Lucas Jr. formed this theory which shows how future expectations influence economic decisions. Based on his work in this area, Professor Lucas won the 1995 Nobel Memorial Prize in Economic Science. *See The Wall Street Journal*, October 11, 1995, p. A2.

the prices participants observe in a competitive market. To emulate the workings of a competitive market, the Commission also should forecast the PCI change based on historical experience, and use the resulting forecast as the adjustment to the PCI cap. Only in such a way can the Commission force the LECs to behave as if they faced a completely competitive market.

GTE will support a five-year rolling average of PCI adjustments, or any other averaging method, provided it can be shown that the selected method accurately forecasts the PCI adjustment. Ideally, PCI adjustments would be calculated for years since 1960. Then, the series would be analyzed as a time series and used to forecast one-year ahead changes in the PCI, which would become the PCI adjustment for that year.

What must be avoided at all costs is a piecemeal forecast of the components of the formula. For example, if the GDPPI is not averaged, the X-Factor is subject to a five-year moving average, and the W-factor is subject to a seven- or ten-year moving average, then the methods will not yield identical results. Concerns about the possibility of gaming the averaging process lead GTE to endorse the simplest method, which is an ARIMA (*i.e.*, Autoregressive Integrated Moving Average) process forecasting method. This method eliminates GTE's concerns about the ability to game the averaging process, and provides the Commission with the ability to estimate the next-year-ahead PCI adjustment factor based on past history.

A.   GTE suggests a formal prediction of the price change in place of a five-year moving average.

The goal is to predict what would happen in a competitive market, and have the

price cap behave accordingly. Using a five-year moving average of past data to serve

as the basis of the price cap is arbitrary. Its only purpose is to smooth a volatile series.

Such smoothing can be justified, but misses the point that the goal is to forecast the PCI

adjustment factor that best mimics competition. GTE believes the appropriate

smoothing should come from an analysis of the data as a consequence of trying to

forecast the output price change. An averaging procedure should be adopted only if it

can be shown to give optimal and statistically valid predictions of the PCI adjustment

factor.

The Commission chose to use the current year GNPPI as "the best predictor of

next year's [GNPPI]" because "[t]hose two series of data exhibit a simple correlation of

.85, indicating very close similarity."[52] Since the same correlation does not hold true for

year-to-year LEC inflation, the Commission needs to employ some method of attaining a

smooth series. Thus, GTE recommends an ARIMA forecasting method *infra*.

B.   For a formal prediction process, GTE suggests an ARIMA forecasting method for forecasting the PCI adjustment factor.

Time series are referred to by their structure. Many time series are found to be

ARIMAs. Simply, this means that these processes are easily forecast on the basis of

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[52]   *D.87-313 FNPRM*, 3 FCC Rcd at 3393.

their own past values. Such processes are called self-predicting. To show how this would work, GTE demonstrates the process on one of the three potential price cap formulas, the LEC direct method.

The process would begin by calculating the PCI adjustment, using the direct formula without smoothing for each previous year:

$$y_t = \%\Delta W_{LEC} - \%\Delta TFP_{LEC} \quad t=0, \cdots, T\text{-}1,$$

that is, for each period from as long a past period as possible to the present. Let T represent the desired forecast year for the PCI adjustment factor. Then, a time series analysis is done on the series with the expressed purpose of predicting y_T.

Specifically, a Box-Jenkins identification procedure[53] should be done to determine what the values of the autoregressive and moving average components are, and whether or not the series needs to be differenced to remove any trends; e.g., unit roots.[54] Once the process is identified, it is used to predict future values of the process. GTE

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[53]   The Box-Jenkins identification procedure is a relatively automatic method for determining the characteristics of an ARIMA process before estimation and forecasting. Specifically, by examining the autocorrelation function, the inverse autocorrelation function and the partial autocorrelation function, the number of lags in the various components of the ARIMA can be determined. See, for example, the SAS ETS (Econometrics and Time Series) Manual version 6.10 for a full description and instructions on application.

[54]   Trend removal is a requirement for application of the ARMA part of the ARIMA methodology. See, for example, Harvey, A.C., The Econometric Analysis of Time Series, 2nd Edition, Wiley, 1989.

recommends using the resulting one-year-ahead prediction as the price cap index change.[55] This is discussed in detail in GTE's Appendix D.

The time series methods proposed here by GTE are standard procedures regularly used by statisticians. The specification of the model would be straight-forward and not subject to manipulation or dispute. Standard tests exist for determining whether an optimal specification of the model has been chosen.

Using optimal time-series' methods to forecast the PCI adjustment factor, on the basis of past PCI adjustments, removes the averaging process from gaming. Further, it removes excess volatility that might inhibit investment, and removes any biases that might lead to the wrong types of investment or production.[56] Indeed, such forecasts automatically remove the random component from the PCI adjustment factor that would cause instability; that is, they automatically smooth. Moreover, once the data are compiled and a new PCI adjustment is calculated from actual data, the forecast can be automatically updated. Such updates can be done easily by simply adding a new data point to the existing model and recalculating the result.

In summary:GTE would support a moving-average concept as a means of eliminating costly and time-consuming reviews while enabling the most recent

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[55]   This is consistent with GTE's position since the inception of price caps. "The GTOCs suggest that the percentage change in the inflation index ought to be based on a forecast of what the change will be." *See D.87-313 FNPRM*, 3 FCC Rcd at 3389.

[56]   Statistical tests exist to determine if the PCI adjustment factor is being optimally forecast.

productivity results to be incorporated into an X-Factor -- provided that such a method

can be shown to accurately forecast price changes on a going-forward basis. Ideally,

the price cap should be forecast on the basis of past annual data using a forecasting

method that can be easily updated annually. GTE proposes the use of an ARIMA

forecasting method to establish a forward looking PCI adjustment factor. This proposal

is qualified by the proviso that a sufficiently long series of actual price and TFP growth

exist to apply the method; *i.e.*, identify and estimate the underlying ARMA process.

V.   The Historical Revenue Method is not an appropriate measure of productivity for the price cap formula since it represents precisely what price caps was designed to avoid. (Issue 2a)

The Historical Revenue Method is better than rate of return regulation -- but only

by a slim margin. This method is completely inappropriate for price cap regulation

because it perpetuates the tie to cost-plus pricing inherent in rate of return regulation.

This approach would restore the negatives the Commission was seeking to escape

when it chose price cap regulation.[57] Essentially, the Historical Revenue Method is a

backward-looking calculation of the productivity factor that would have produced a

specified rate of return. This method, proposed by AT&T,[58] assumes that the price cap

LECs were to be constrained to an 11.25 percent rate of return -- which is at the outset

an inaccurate assumption. The price cap plan, by way of the sharing mechanism,

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[57]   *See* discussion of the "Rationale for adoption of incentive regulation." *LEC Price Cap Order*, 5 FCC Rcd at 6789-6791.

[58]   *See Fourth Notice* at para. 77.

allowed price cap LECs to earn various "pseudo" rates of return. The lower formula

adjustment mechanism was triggered at a lower limit of 10.25 percent, but upper ranges

depended on the 50 and 100 percent sharing ranges. Even the sharing mechanism did

not constrain LECs to an 11.25 percent rate of return.

In addition, the Historical Revenue Method does not serve as an incentive to

increase productivity or to become more innovative. As discussed by NERA,[59]

measurements of achieved productivity should only be used to serve as a diagnostic

measure to determine if the original parameters were in serious error. If not,

productivity gains resulting from specific efforts that are then taken away undermines

the "incentive" in incentive regulation. NERA further explains that regulatory accounting

rules, when used to measure LEC profits, are inappropriate proxies for economic profit

just as accounting earnings are an inappropriate measure of changes in economic

profit.

In contrast, the method proposed by GTE for deriving the PCI will mimic the

mechanism through which the competitive market captures productivity gains and

passes them on to consumers. When a competitive firm introduces a productivity-

enhancing innovation, it lowers its own costs relative to the industry average, on which

the market price is based. For an interim period, the firm enjoys higher earnings as a

reward for its innovation. As the rest of the industry adopts the innovation over time,

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[59]   See USTA's Comments in this proceeding, Attachment C.

the industry average cost is driven down, and price along with it. This passes the benefit of the innovation on to consumers.

The forecasting method proposed by GTE will predict the effect of this process in the next year, based on the past behavior of the PCI which in turn would incorporate information about industry TFP and input prices. Rather than arbitrarily attempt to "recapture" LEC earnings from prior years as AT&T's Historical Revenue Method will do, GTE's approach would limit LEC earnings, and pass the benefits of productivity gains to consumers, in much the same way a competitive market would do.

In summary: The Historical Revenue Method is a backward-looking calculation of the productivity factor that would have produced a specified rate of return. The Commission should not adopt this Model, which is contrary to the entire logic of price cap regulation.

VI.   The Historical Price Method is not superior to the Christensen TFP approach. (Issue 2b)

Under economic theory, prices and quantities can be used to symmetrically calculate productivity growth, since both operate on the assumption that input values equal output values in each time period. The concern arises that, if yearly earnings vary during the historical period, a price-based productivity study could produce significantly different results than a quantities-based productivity study (the TFP method). As GTE stated *supra*, the goal of the PCI adjustment factor is to forecast what the LECs can achieve. Therefore, GTE submits that it is best to use actual measurements of quantities as opposed to price changes as a basis for estimating the productivity of the LECs. In its

analysis of the two methods, NERA also supports using a quantities-based method for the LECs as real price reductions are the result of productivity growth. Further, a direct (quantities) method, rather than an indirect (price change) method, best quantifies possible differences between the historical period and the future.[60]

Further, the Commission is correct in its description (*Fourth Notice* at para. 85) of the Historical Price Method[61] as a "cost-differential factor rather than a productivity factor." As used by the Commission, the Historical Price Method relies on a specified rate of return for the LECs.[62] TFP does not rely on a specified rate of return to determine a productivity factor. Rather, TFP relies on actual measurements of LEC inputs and outputs, uses actual indexes of cost and output, and does not have to infer what productivity was based on changes in prices.

In addition, as this Commission itself notes (*Fourth Notice* at para. 88), there are "problems with the reliability of the data" used in the Historical Price Method. As noted, the inclusion of WATS data beginning in 1986-87[63] and an inability to include special access because of a discontinuity in the time series makes the data used as a basis for

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[60]   *Id.*

[61]   The Commission refers to the Frentrup/Uretsky study for the years 1984-1990 as the Historical Price Method. *Fourth Notice* at para. 86.

[62]   "[U]nit costs for all time periods were calculated using a rate of return of 12.00 percent, the authorized rate of return at the time that the study was conducted. The rate of return was held constant over time in order to normalize the unit cost data for changes in the prescribed rate of return." *Fourth Notice* at para. 89.

[63]   *Id.* at n.104.

the Historical Price Method a significant issue. TFP provides a more economically

meaningful measurement of productivity than the Historical Price Method and should be

adopted.[64]

In summary: The goal of the PCI adjustment factor is to forecast what the LECs

can achieve. Therefore, GTE submits that it is best to use actual measurements of

quantities, as used in the Christensen TFP method, rather than price changes as a basis

for estimating the productivity of the LECs.

VII. THE PCI ADJUSTMENT FACTOR SHOULD NOT INCLUDE A CONSUMER PRODUCTIVITY DIVIDEND. (Issue 2c)

In the AT&T Further Notice, the Commission introduced a CPD as an additive to

the productivity factor during the transition to price caps to "stimulate carriers to

generate productivity gains in excess of historical experience" and to create "significant

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[64]   It is vitally important that whatever method the Commission ultimately decides to adopt must be methodologically consistent and economically meaningful. The inclusion of the 1984 data point in the original Frentrup/Uretsky study and its subsequent omission in the updated study severely damages the credibility of the study used by the Commission. Arbitrary decisions to change the methodology employed, or the data sets used by the methodology, in order to obtain a specific result make it impossible for the LECs to make rational forward-looking business decisions. This Commission's acknowledgment that the 1984 data point was excluded because LECs' rates of return were higher than the previous Commission anticipated demonstrates the arbitrariness of the decision. See Bell Atlantic Telephone Companies, et al. v. FCC, Nos. 95-1217, et al., Brief for Respondents, dated October 13, 1995, p.36. It does not prove that the 1984 data point was a statistical outlier, only that its omission produced results more in line with this Commission's goal to restrict earnings.

downward pressure each year" on the price cap index.[65] In the *LEC Price Cap Order*,

the Commission, similarly, added a 0.5 percent CPD to the productivity factor "to assure

that the first benefits of price caps flow to customers in the form of reduced rates."[66] No

CPD should be included in the price cap formula adopted in this proceeding. First, the

value selected for the CPD was arbitrary, with no justification provided for how this

value was derived.[67] Second, the Commission chose this mechanism to "assure the

first benefits of price caps" were passed to customers. The industry is no longer in the

"first" stage of price caps, hence this rationale has disappeared. Surely, the "first

benefits" of price caps have been passed to customers during the five years the CPD

was included in the productivity factor. Additional benefits will continue to be passed

on, as the effect of the CPD has become embedded in the existing PCIs. Third,

adoption of a methodology that forecasts the next year, as recommended by GTE, or,

in the alternative, a methodology that includes only years under price cap regulation,

would obviate the need to adjust for any perceived historical gains. The stated purpose

of the productivity factor is to estimate achievable productivity gains.[68] There is no

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[65] *Policy and Rules Concerning Rates for Dominant Carriers*, Further Notice of Proposed Rulemaking, CC Docket No. 87-313, 3 FCC Rcd 3195, 3407-08 (1988) ("*AT&T Further Notice*") (*subsequent citations omitted*).

[66] *LEC Price Cap Order*, 5 FCC Rcd at 6799.

[67] Agency decisions must be based on "facts [that] have some basis in the record." *See National Treasury Employees Union v. Horner*, 854 F.2d 490, 498 (D.C. Cir. 1988).

[68] *National Rural Telecom Ass'n v. FCC*, 988 F.2d 174, 183 (D.C. Cir. 1993).

evidence on the record that the LECs can continuously exceed historical productivity gains by 0.5 percent. Thus, there is no justification for adding a CPD.

In summary:GTE opposes the addition of a CPD to LEC productivity. First, the decision to add a CPD, and the value selected, were arbitrary. Second, a mechanism to pass the first benefits of price caps is no longer needed. Third, adoption of a methodology that forecasts the next year, as recommended by GTE or, in the alternative, a methodology that either includes only years under price cap regulation or more heavily weights years under price cap regulation obviates the need to adjust for any historical gains.

VIII. A SINGLE PCI ADJUSTMENT FACTOR SHOULD BE ESTABLISHED WITHOUT SHARING. (Issues 4 and 5)

The formula for the PCI adjustment factor supported by GTE is that which would prevail in a competitive market. In a single market, neither multiple prices nor multiple price changes for the same product can persist for very long. Arbitrage will eliminate all but random and unpredictable differences. These, by their very nature, do not persist. Since competition implies a single price in a market, this implies a single price change once a common price is charged. Thus, to mimic a competitive market, a single PCI adjustment factor should be employed. Further, in a well functioning competitive market, the rate of output price changes would not contain a sharing term. The Commission's inclusion of sharing distorts the price cap mechanism as a means of emulating a competitive market. Moreover, the inclusion of sharing makes the price cap mechanism mimic rate of return regulation.

As discussed in detail by the ICC, the use of a lagged industry average permits the preservation of the benefits of productivity over an extended period of time and provides both the incentive and opportunity to beat the average. Per the ICC, "the industry average is the only reasonable target" because "it is the only measure of productivity which converts the industry average ... input price index into an industry average output price index."[69] This rationale is equally applicable to the LEC industry.[70] A competitive market requires a constant effort to improve productivity.

GTE recognizes the Commission's concern that use of an industry average would allow the more efficient LECs to earn more than those that are less efficient. But, in fact, this is the way a competitive market functions. In a competitive market, firms must undertake actions to enhance productivity in order to improve their earnings and to maintain their status in that market. Those firms that do not take such actions will realize a decrease in earnings and, if unimproved, eventual exit from the marketplace. In

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[69] Interstate Commerce Commission Ex Parte No. 290 (Sub-No. 4), Railroad Cost Recovery Procedures - Productivity Adjustment, decided March 22, 1989, at 453.

[70] The Commission should not draw the conclusion that the 5.3 percent X-Factor reflects achievable productivity based on the number of LECs selecting this factor for the interim period. The Commission correctly states (at para. 8) that GTE selected 4.0 percent for eight study areas and 5.3 percent for 38 study areas. Those 38 study areas represent less than fifty percent of GTE's rate base. Further, GTE selected the 5.3 percent option because the 1.3 percent incremental difference between 5.3 and 4.0 had less near-term harmful impact on GTE's earnings than the impact of sharing -- not because it can be achieved. Further, if these factors were to have remained in place for more than one year, GTE would not have selected the 5.3 percent option for 38 study areas as the compounding effect of an offset this high is unsustainable.

addition, as the Commission notes (*Fourth Notice* at para.129), LECs have the ability under the existing rules to file tariffs for rate increases to prevent confiscatory rates.

GTE submits that, in setting the PCI adjustment factor equal to the industry average of LEC input price growth less LEC productivity growth without a sharing requirement, the Commission will establish a factor that will prompt all LECs to improve their efficiency. Those LECs that are performing above industry average will maintain an incentive to increase efficiency given that the benefits associated with increased efficiency can be retained. LECs at or below average will continue to strive to increase their efficiency. The overall result will be increased efficiency for the entire industry.

The key to increased industry efficiency is the ability to retain the earnings that result from achieving that increase. As the Commission rightly recognizes, "the sharing mechanism blunts the efficiency incentives created by the price cap formula."[71] If the Commission wants to provide incentives for the LECs to achieve greater efficiency, then it must eliminate the sharing mechanism. The elimination of sharing is the only incentive that will produce the highest efficiency gains possible -- which, in turn, will be reflected in the industry average TFP. Thus, the LECs' ongoing efficiency gains will be passed through to consumers.

Further, sharing perpetuates the link to rate of return regulation and all the "baggage" associated with that form of regulation; *e.g.*, accounting conventions, jurisdictional separations, affiliate transaction rules, and depreciation prescriptions. These

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[71]   *Fourth Notice* at para. 114.

items have nothing to do with the functioning of a competitive marketplace. Further, if the sharing mechanism is retained, it will interfere with other mechanisms the Commission is seeking to add to its price cap plan. In a parallel proceeding, the Commission has tentatively proposed a framework for selectively applying streamlined or nondominant regulation to access markets that meet competitive criteria.[72] If sharing were to remain in place, it would create an undesirable rate of return link between markets which remain in price caps, and competitive markets which have been removed from price caps.

Sharing was instituted by the Commission as backstop mechanism for errors in its estimate of LEC productivity.[73] Since the record in this proceeding should provide ample evidence to substantiate the selection of a productivity factor that accurately predicts the LECs' productivity, sharing is no longer needed as a backstop mechanism. The Commission will have LEC pre- and post price cap productivity data available for analysis plus extensive documentation on productivity calculation methodologies. It is time to eliminate the sharing mechanism and allow the LEC price cap plan to truly emulate a competitive market.

In summary: GTE submits that the continued inclusion of sharing diminishes the coherence and effectiveness of price caps to a point where it becomes indistinguishable from rate of return regulation modified by factors forcing prices

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[72] The Commission addresses streamlined regulation in the *Second Notice* at paras. 127-51 and nondominant treatment at paras. 152-58. *See, D.94-1,* Second Further Notice of Proposed Rulemaking, CC Docket No. 94-1, FCC 95-393 (released September 20, 1995) (*"Second Notice"*).

[73] *See First Report and Order* at para. 191.

downward. In contrast, the formula for the PCI adjustment factor supported by GTE is

that which would prevail in a competitive market. Thus, to mimic a competitive market,

a single PCI adjustment factor should be employed. Further, in a well-functioning

competitive market, the rate of output price changes would not contain a sharing term.

Inclusion of a sharing term distorts the price cap mechanism and prevents it from

emulating a competitive market. The record of this proceeding will provide ample

evidence to substantiate the selection of a productivity factor that accurately predicts

the LECs' productivity. Therefore, a "backstop" mechanism is not needed.

IX. THE COMMISSION SHOULD ELIMINATE THE SEPARATE COMMON LINE FORMULA. (Issues 6a and 6c)

Since TFP is a direct measure of productivity where all inputs (labor, capital,

materials) and all outputs (lines, minutes, *etc.*) are taken into account, a separate

formula for the common line basket is not required. All changes in LEC productivity

over time are captured regardless of whether they are driven by changes in minutes,

lines, or any other output. If a TFP methodology is adopted, further adjusting the

common line basket would result in "double counting" productivity gains because TFP

growth uses lines and minutes as measures of output growth.[74]

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[74] A properly constructed productivity offset should reflect the entire range of diverse factors that cause changes in the unit cost of production for the LECs and should measure changes in the overall efficiency of production. Partial measures of productivity are inconsistent with the economics of price caps because they are confined to particular inputs or outputs. Therefore, GTE opposes the use of an interstate-only TFP methodology, as discussed *supra.*

All traffic sensitive services are marked by economies of scale as increased growth generates productivity gains. Thus, as more units of demand are carried on a LEC's network, an increase in productivity will be realized for all services, not just common line. Although the Commission concluded in the *First Report and Order* (10 FCC Rcd at 9078-9079) that LECs have little influence over common line usage growth,[75] this becomes irrelevant with the use of a TFP methodology. Neither who generates the demand nor which access service experiences the growth is relevant, since any growth in demand will be captured by the estimate of Total Factor Productivity. Once the productivity factor is set based on TFP, the benefits of demand growth at the long-term trend level for all services will be passed on to access customers. It makes no difference what the common line growth rate is or which entity is stimulating demand. TFP incorporates the effect of input growth for all services.

In summary: Adoption of a TFP methodology eliminates the need for a separate common line formula. TFP measures all inputs and outputs regardless of which party stimulates the demand. Further, the removal of the separate common line formula made possible by the adoption of TFP, eliminates the controversy over whether or not the formula should be based on a per-line or Balanced 50/50 formula.

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[75] GTE does not agree with the Commission's conclusion. LEC access charge reductions (when passed through) do stimulate long distance calling which, in turn, results in increased access usage. Since divestiture, reductions in LEC access charges have more than explained the reductions in interexchange rates.